grass-green to the white and yellow green—which give such richness of colour to the vegetation in the Atlantic Ocean, are almost entirely absent in the Arctic seas.

I have already mentioned that leaf-weed and coral algæ attain a great size in the Arctic Ocean. This is also the case with a considerable number of other Arctic algæ. Thus, the brown algæ, *e.g. Desmarestia aculeata*, L., and *Dichloria viridis*, Müller, and the red algæ, *Delesseria sinuosa*, G. and W., and *Halosaccion ramentaceum*, L., as well as the green algæ, *Monostroma Blyttii*, Aresch., and *Chætomorpha melagonium*, W. and M., show a high degree of development; a fact which proves that these algæ not only endure, but are quite at home in, the Polar water.

Another feature of great interest relating to the subject are the biological conditions of the algæ flora. Algæ which conclude their existence in a single year are either wanting, or at all events very few. Nearly all Arctic algæ live several years, and in order that they may be able to effect the work of propagation and nourishment with the little supply there is of heat and light, their organs are in operation during the dark as well as the light season. Whilst wintering at the northernmost part of Spitzbergen in 1872-73, Prof. Kjellman observed in the middle of the winter, viz. at a time when the sun was lowest and the darkness therefore most intense, that a considerable development and growth of the organs of nourishment took place, while, as regards the organs of propagation, he found that it was just at this season that they were most developed. Spores of all kinds were produced and became mature, and they developed into splendid plants. The Arctic algæ therefore present the remarkable spectacle of plants which develop their organs of nourishment, and particularly their organs of propagation, all the year round, even during the long Polar night, growing regularly at a temperature of between $-1°$ and $-2°$ C., and even attaining a great size at a temperature which never rises above freezing-point.

The result at which Prof. Kjellman arrived with regard to the development of the Arctic flora was this, that the algæ flora of the Arctic Ocean is, contrary to the Phanerogamic flora, not an immigrant flora, but that its origin lay in the Polar Sea itself. This theory is, he believes, proved by the facts that (1) the Arctic algæ flora is rich in endemic species, these being not fewer than 37, or 22 per cent. of the whole flora); and that (2) there are many species found both in the Northern Atlantic and the Pacific Oceans a large percentage of which reaches very far north in the Arctic Sea, and which have attained a high degree of development there, being characteristic algæ of the Arctic Ocean. That the endemic species owe their origin to the Arctic Ocean cannot be doubted; and that the species referred to under (2) have been originated there and gradually spread to the other two occans is more than probable. If this be so, Prof. Kjellman estimates the number of species whose origin must be referred to the Arctic Ocean at 100, *i.e.* about 60 per cent of the entire algæ flora.

There remain now but a few remarks to make on the algæ flora of that part of the Arctic Ocean which has been named the Norwegian Polar Sea.

If sufficient notice be taken of the geographical position, this sea may be said to be the most favoured on the globe in the way of temperature. Although north of the Polar Circle, and reaching thence to 72° N. lat., it is never frozen, not even along the coasts. The mean temperature of the sea at the North Cape during the coldest season, viz. March, April, and May, is $+3°$ C., and during the true winter months, December to February, $+3°·03$ C. If to this be added that the water is very salt, and that the bottom nearly everywhere consists of rocks or boulders, and that the coast is full of fjords and islands, every condition for the development of a rich algæ flora is present. And indeed the flora here is more copious than in the true Arctic Ocean. There are no large deserts here. The upper shore-belt is covered with algæ, while brown algæ (*Fucaceæ*) are found everywhere, sometimes less, sometimes more mixed with red and green ones. The lower belt is the home of the leaf-weed algæ, most of which belong to other species than those of the true Arctic Sea. The coral algæ, too, are well represented, and even these differ from those of the true Arctic Sea in possessing brighter colours. The number of red algæ belonging to other groups is also greater than in the true Arctic Sea. The total number of algæ species in the Norwegian Polar Sea is 194, a number which is very great when we remember its limited area. There are in the true Arctic Sea, which is so much larger, only 174 species.

With regard to the general character of the algæ flora of the Norwegian Polar Sea, it must be described as a mixed flora, made up of species belonging partly to the Arctic and partly to the Atlantic Oceans, and some endemic ones. Prof. Kjellman believes, and in this I entirely concur, that the former are the original species characteristic of the spot, and that they are remnants from the time when the Arctic Ocean was larger than it is at present, *i.e.* during the Glacial period. The Atlantic species have immigrated during more recent times with the Gulf Stream, as they have by degrees become so prominent that the algæ flora of the Norwegian Polar Sea must, on the whole, now be referred to the Atlantic Ocean.

It has already been said that the algæ flora of the west coast of Greenland occupies a transitory position between that of the North Atlantic and that of the true Arctic Ocean. According to W. G. Farlow ("Marine Algæ of New England and Adjacent Coasts," 1881) this is far more the case with the algæ flora of the northern parts of the United States, and it may be of interest to note that by the aid of the Polar current flowing there a considerable number of true Arctic algæ have succeeded in penetrating to the forty-second degree of latitude, *i.e.* the latitude of Central Italy, or perhaps, more correctly speaking, have remained on the shores of New England from the very period when the Arctic Ocean extended thither at the time of the Glacial Age.

VEIT BRECHER WITTROCK
Academy of Science, Stockholm

NOTES

WE are glad to learn that the trustees have appointed Prof. Newcomb Professor of Mathematics and Astronomy in the Johns Hopkins University, and that he has agreed to accept the position. The University begins the session with 273 students, of whom 160 are graduates, and the attendance is distributed well through all the departments. Sir William Thomson's lectures, as might be expected, were a great success.

THE following changes are proposed to be made in the Council of the London Mathematical Society for the ensuing session:—Prof. Sylvester, F.R.S., and Prof. Greenhill are nominated to fill up the places vacated by the late Prof. Rowe and Mr. W. D. Niven, F.R.S. Mr. J. W. L. Glaisher, F.R.S., has been selected for the Presidentship, while Dr. Henrici, F.R.S., Prof. Sylvester, F.R.S, and Mr. J. J. Walker, F.R.S., have been nominated Vice-Presidents. In consequence of Dr. Henrici's not having yet returned from his visit to Canada and California, it is not yet certain whether he will deliver his retiring address at the annual meeting (November 13), or defer its delivery to a later date in the session. It is proposed to present the De Morgan Memorial Medal to Prof. Cayley, F.R.S., its first recipient, at the annual meeting.

LORD M'LAREN AND MR. JOHN MURRAY, two of the directors of the Ben Nevis Observatory, ascended Ben Nevis last week

and inspected the new buildings which have been erected during the summer, and which were now declared open. The new buildings include additional bedrooms and observing rooms, a tower for exit during winter and for self-registering wind instruments, and a tourists' shelter, the whole having cost over 2000*l*. The Observatory is now very completely equipped. Provisions and stores for a year have been conveyed to the top, and the observers are now fully provided for in their long winter residence. It is just a year since the Observatory was opened, and during this time hourly observations have been taken day and night without a single break. Over 2000 persons have ascended the mountain during the summer, and 1046 telegrams have been despatched by tourists to their friends in various parts of the world.

THE list of awards, medals, &c., made by the International Juries of the Health Exhibition have been announced. The total number of gold medals awarded is 278 ; the Society of Arts present 11 medals. The Society's Siemens Prize for the best application of gas to heating and cooking has been awarded to Mr. Thomas Fletcher. Medals for meteorological instruments, diagrams, models, &c., have been awarded to Messsrs. Casella, Negretti and Zambra, Richard Frères, and Richardson and Co. For science teaching the Japanese schools have carried off medals, as well as Allan Glen's Institute, Glasgow, the Oldham School of Science, and the École Lemonnier, Paris. The Brothers of the Christian Schools have obtained in the Educational Section two gold and two silver medals and two diplomas of honour.

WE regret to announce the death of Mr. Robert Sabine, C.E., the son-in-law of Sir Charles Wheatstone. Mr. Sabine, as our readers know, has done good work in connection with the applications of electricity.

MUCH interest is manifested, both in Canada and the United States, in the enterprise of Lieut. W. R. Gordon, who was selected by the Canadian Meteorological Service for the expedition to Hudson's Bay, to establish stations for scientific observations. The work has already begun, and at each of the seven stations selected the usual meteorological observations will be made. Heavy tides will be measured ; the drift of water will be noticed ; and the conditions and state of the ice. Cape Hope is the most important station, and here a temporary magnetic station has been opened. This first expedition has been provided for by votes of 70,000 dollars by the Dominion Government for the purpose of obtaining reliable information as to the navigation of the Strait to the Bay, and to decide upon the feasibility of the adoption of the route as a summer outlet for the produce of the North-West. Each station party consists of two men and an Esquimaux interpreter, besides the officer in charge, and sufficient provisions and fuel for fifteen months are supplied. Lieut. Gordon, the head of the present Expedition in the *Neptune*, has been for ten years in the British Navy and five years in that of Canada. He is accompanied by Dr. Robert Bell, geologist, Charles R. Tuttle, of Winnipeg, historiographer, and seven officers. The seven stations are to be established in the following places, six on the Strait and one on the west shore of Hudson's Bay :—The first at Cape Chadley, the second on Resolution Island, the third at Cape Hope, the fourth on the north bluff of the mainland or on one of the Upper Savage Islands, the fifth on the south-east end of Nottingham Island, the sixth on the south side of Mansfield Island, and the seventh at Fort Churchill, on the mouth of the Churchill River.

IN the course of a lengthy communication to Sir Arthur Gordon, the Governor of Ceylon, suggesting improvements in the public instruction of that colony, the Rev. S. Langdon advocates the establishment of a University in Colombo, on the ground that the Universities for which Singhalese youth are now prepared are ill adapted to the requirements of Ceylon. The English University examinations are, he says, intended for a different class of candidates. They tend to a total separation of the scholarly youth of Ceylon from their own classics in favour of those of Greece and Rome. The physical science references are to examples found commonly in the British Islands, but rarely in Ceylon. With regard to the Cambridge Local Examinations, the science master of the colonial Royal College points out that in botany the Ceylon students are placed at considerable disadvantage compared with those in England, and suggests that the Cambridge Syndicate be requested to arrange that plants of tropical well-known orders of equal structural value be substituted for those given in England, and that answers to general questions, such as those referring to useful timber-trees, useful vegetables, and other plants of economic use, be recognised, if correctly given for Ceylon, as of equal value with English answers. He then selects, as an illustration of the difficulty under which a Ceylon candidate labours, questions such as these :—Compare the daisy with the dandelion ; compare the rose with the buttercup ; describe a fir cone, &c. ; all easy enough for an English but not so for a Ceylon boy. This objection is stated to be true not only of botany, but also of other branches of natural science. The complaint is that the higher examinations for which alone the youth of the colony can be prepared are destitute of all local references, and are therefore neither calculated to develop or test an intelligent acquaintance with the subject. Besides, as the masters can prepare for any one of four foreign Universities (London, Cambridge, Calcutta, or Madras), there is little unity in the system of higher education. Moreover the expense of residing at one of these Universities deters many students from taking a University degree at all. On the whole, the case made out by Mr. Langdon in favour of a local University is, regarded from the purely educational point of view, a very strong one. He sums up this portion of his report by stating that the advantages of such a University would be—(1) unity of higher education, (2) a higher education adapted to Ceylon rather than to English requirements, (3) the correction of many present defects, especially the neglect of practical and technical studies, (4) the granting of degrees now only attainable with much expense, (5) the encouragement of vernacular education.

COMMANDER CRAWFORD PASCO, R.N., writing from Elsterwick, Victoria, N.S.W., says :—"If at *all* coast stations (light-houses, &c.) the tide was as regularly recorded as the barometer, &c., ascertaining, where practicable, its force as well as direction, and, monthly, one simultaneous observation made at a given time, to be called a *term* day, similar to that at magnetical observatories where the clocks were set to Göttingen mean time, and for tidal purposes may be Greenwich, Washington, or any other meridian, I feel sure valuable results would be obtained."

WITH reference to the recent experiments on directing balloons, M. W. De Fonvielle explained in a recent paper, with the aid of diagrams, an elongated balloon which could be steered to the extent of being kept with the longest axis in the direction of a given current, and could be made to ascend or descend by the use of horizontal propelling screws. He further explained an adaptation he proposed of M. Dupuy de Lome's device of placing an air pouch in the balloon to compensate for loss of gas so as to form ballast air-chambers in the elongated machine.

IT will be seen from our advertising columns that some friends and fellow-workers of the late Frank Hatton desire to perpetuate his memory in the creation of an annual prize in a branch of chemistry in which he had distinguished himself at home. We heartily commend the scheme to our readers.

IN the last number of the *Agricultural Students' Gazette*, edited by students of the Royal Agricultural College, Cirencester,

will be found, besides the usual College news, "Observations on the *Œstridæ* commonly known as Bot-Flies," or warble flies, by Miss E. A. Ormerod, one of the lecturers of the College; also an interesting account of an excursion to Sir J. B. Lawes's experimental farm at Rothamsted. This little periodical holds a good place among college magazines, by the interest and value of its articles.

FROM a report by the head of the Japanese Meteorological Department on the two typhoons of August last, which caused much loss of life and damage to property, it appears that the Japanese have not had to wait long for a practical demonstration of the wisdom of their recent step in increasing the number of telegraphic weather reports from their meteorological stations to three daily. Although the second storm travelled nearly 800 miles in the course of twenty-four hours, the parts of the coasts threatened received, under the most unfavourable circumstances, several hours' warning. Mr. Knipping takes advantage of the occasion to recommend an addition to the number of signal stations which would bring them up to 150 or 200, and also to point out that Japan's most recent possession, the Loochoo Islands, is a most important meteorological outpost, for about 90 per cent. of the typhoons whichgravage these regions are noticed there a day earlier than in Japan.

IN reference to a recent note on the subject, Mr. W. Mattieu Williams writes that in his "Through Norway" (published in 1877) he stated on page 108 that "the North Cape is usually described as the northernmost extremity of Europe; but this is not quite correct. There is a low glaciated tongue of rock, called *Knivskjierodden* or *Knivskjaelodden*, about a mile to westward of North Cape, which projects farther north than the Cape itself." "It is a misnomer," he states, "to call this a 'Cape,' especially in the presence of magnificent capes which abound thereabouts. (The perpendicular face of North Cape is 974 feet high; others are above 1000 feet.) It should not be forgotten that neither North Cape nor this little ambitious out-poke is the northernmost point of the European *continent*. This distinction belongs to Nord Kyn, the North Cape and Knivskjaelodden being on Magerö, an outlying island."

THE authorities of the University of Tokio have, we observe, instructed one of their officers to devote himself wholly to the study of seismic phenomena. The gentleman selected for this purpose, Mr. Sekiya, is the Japanese Secretary to the Seismological Society of Japan, and has already had much experience in earthquake observation, which has thus become an official study in that country.

A WRITER in a recent issue of the *North China Herald* discusses the early Chinese notions of immortality. In the most ancient times ancestral worship was maintained on the ground that the souls of the dead exist after this life. The present is a part only of human existence, and men continue to be after death what they have become before it. Hence the honours accorded to men of rank in their lifetime were continued to them after their death. In the earliest utterances of Chinese national thought on this subject we find that duality which has remained the prominent feature in Chinese thinking ever since. The present life is light; the future is darkness. What the shadow is to the substance, the soul is to the body; what vapour is to water, breath is to man. By the process of cooling steam may again become water, and the transformations of animals teach us that beings inferior to man may live after death. Ancient Chinese then believed that as there is a male and female principle in all nature, a day and a night as inseparable from each thing in the universe as from the universe itself, so it is with man. In the course of ages, and in the vicissitudes of religious ideas, men came to believe more definitely in the possibility of communications with supernatural beings. In the twelfth century before the Christian era it was a distinct belief that the thoughts of the sages were to them a revelation from above. The "Book of Odes" frequently uses the expression "God spoke to them," and one sage is represented after death "moving up and down in the presence of God in heaven." A few centuries subsequently we find for the first time great men transferred in the popular imagination to the sky, it being believed that their souls took up their abode in certain constellations. This was due to the fact that the ideas of immortality had taken a new shape, and that the philosophy of the times regarded the stars of heaven as the pure essences of the grosser things belonging to this world. The pure is heavenly and the gross earthly, and therefore that which is purest on earth ascends to the regions of the stars. At the same time hermits and other ascetics began to be credited with the power of acquiring extraordinary longevity, and the stork became the animal which the Immortals preferred to ride above all others. The idea of plants which confer immunity from death soon sprang up. The fungus known as *Polyporus lucidus* was taken to be the most efficacious of all plants in guarding man from death, and three thousand ounces of silver have been asked for a single specimen. Its red colour was among the circumstances which gave it its reputation, for at this time the five colours of Babylonian astrology had been accepted as indications of good and evil fortune. This connection of a red colour with the notion of immortality through the medium of good and bad luck led to the adoption of cinnabar as the philosopher's stone, and thus to the construction of the whole system of alchemy. The plant of immortal life is spoken of in ancient Chinese literature at least a century before the mineral. In correspondence with the tree of life in Eden there was probably a Babylonian tradition which found its way to China shortly before Chinese writers mention the plant of immortality. The Chinese, not being navigators, must have got their ideas of the ocean which surrounds the world from those who were, and when they received a cosmography they would receive it with its legends.

MR. SIDNEY OLLIFF has been appointed Assistant Curator of the Australian Museum, Sydney, New South Wales.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii* ♂) from South Africa, presented by Mr. Thomas Eley; a Grivet Monkey (*Cercopithecus griseo-viridis* ♂) from West Africa, presented by Mrs. K. E. Villiers; a Common Paradoxure (*Paradoxurus typus*) from India, presented by Mrs. L. McArthur; a Hedgehog (*Erinaceus europæa*), British, presented by Mr. C. G. Hopkins; a Laughing Kingfisher (*Dacelo gigantea*) from Australia, presented by Mrs. A. M. Packard; two —— Seed-eaters (*Crithagra* ——) from South Africa, presented by Mr. W. B. Cheadle, F.Z.S.; a Mute Swan (*Cygnus olor* ♂), European, presented by Lady Siemens; a Common Chameleon (*Chamæleon vulgaris*) from North Africa, a Common Viper (*Vipera berus*), British, presented by Mr. F. H. Jennings; a Proteus (*Proteus anguinus*), European, presented by Mr. W. J. Milles; three Common Marmosets (*Hapale jacchus*) from Brazil, six Canadian Beavers (*Castor canadensis*) from Canada, two Lesser Sulphur-crested Cockatoos (*Cacatua sulphurea*) from the Moluccas, deposited; a Talapoin Monkey (*Cercopithecus talapoin*), an Allen's Galago (*Galago alleni*), a Thick-billed Pigeon (*Treron macrorhyncha*), a River Jack Viper (*Vipera rhinoceros*) from West Africa, two Horrid Rattlesnakes (*Crotalus horridus*) from Florida, purchased; four Hardwick's Mastigures (*Uromastix hardwickii*) from India, two Bengal Monitors (*Varanus bengalensis*) from Bengal, a Nilotic Crocodile (*Crocodilus vulgaris*) from Africa, received in exchange.